Canadian Centre for Occupational Health and Safety

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HUMIDEX AND ITS USE IN THE WORKPLACE

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David Charron

Canadian Centre for Occupational Health and Safety

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250 Main Street East
Hamilton Ontario
L8N 1H6
416-572-2981
FAX 416-572-2206
Telex 061-8532

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1. WHAT IS HUMIDEX?

Humidex measures the contribution humidity makes, together with high temperature, in reducing the body's ability to cool itself.

Humidex is an equivalent temperature. It provides a number which describes how hot people feel, much in the same way the equivalent chill temperature, or "wind chill factor," describes how cold people feel.

Environment Canada uses humidex to alert the public when conditions of heat and humidity are possibly hazardous.

2. WHAT IS THE IMPORTANCE OF HUMIDITY?

The body attempts to maintain a constant temperature of 37°C at all times. In hot weather, the body produces sweat, which cools the body as it evaporates. As the humidity or the amount of moisture in the air increases, sweat does not evaporate as readily. Sweat evaporation stops entirely when the relative humidity reaches about 90 percent. Under these circumstances, the body temperature rises and may cause illness.

3. WHAT ARE SOME OF THE HAZARDS OF WORKING IN HOT ENVIRONMENTS?

There are several common heat-related illnesses. Some are more severe than others.

Heat rash or prickly heat, occurs when blocked sweat glands become inflamed. This painful rash reduces the body's ability to sweat and to tolerate heat.

Heat cramps are painful spasms of the muscles. The muscles used in performing the work are most susceptible. They are caused by the failure of the body to replace its lost body salts and usually occur after heavy sweating.

Heat exhaustion results when the body loses large amounts of fluid by sweating during work in hot environments. The skin becomes cool and clammy. Symptoms include profuse sweating, weakness, dizziness, nausea, and headaches.

Heatstroke is the most serious condition and requires immediate medical attention. The body stops sweating, and its temperature becomes very high (even exceeding 41°C). Symptoms include hot and dry skin. Heatstroke can lead to delirium, convulsions, coma and death.

Heat-related illnesses can become quite severe. Further details are available in the CCOHS publication "Work in Hot Environments."

4. CAN WORKPLACES USE HUMIDEX TO MONITOR CONDITIONS THAT MAY RESULT IN HEAT-RELATED ILLNESS?

Generally speaking, no. Humidex is intended for the general public to express the combined effects of summer temperatures and humidity.

Heat-related illnesses depend on many workplace factors in addition to air temperature and humidity. Wind speed or air movement, work load, radiant heat sources and a person's physical condition are also important.

5. WHEN CAN HUMIDEX BE USED?

Under certain workplace conditions, the humidex may be useful in evaluating occupational exposures to heat. For example, when humidity is high, but when wind speed and radiant heat sources do not significantly contribute to the heat burden, humidex may be useful. Offices are typical of workplaces where humidex could be used.

6. HOW IS HUMIDEX INTERPRETED?

The relation between humidex and comfort is subjective. It varies widely between individuals. Environment Canada provides the following guide as a measure of discomfort according to humidex:

- Where humidex levels are less than 29°C, most people are comfortable.
- Where humidex levels range from 30°C to 39°C, people experience some discomfort.
- Where humidex levels range from 40°C to 45°C, people are uncomfortable.
- Where humidex levels are over 45°C, dangerous conditions exist and many types of labour must be restricted.

The table lists humidex values from air temperature and relative humidity readings. For example, if the air temperature is 25°C and the relative humidity is 35 percent, the humidex is 26°C. Most people should be comfortable at this level. If the air temperature is 32°C and the relative humidity is 80 percent, the humidex is 47°C. At this level, dangerous conditions exist.

Workplaces must use caution when applying the humidex. A high humidex can serve as a cue to assess workplace conditions more precisely.

7. WHAT INDEX SHOULD WORKPLACES USE TO MONITOR CONDITIONS THAT MAY RESULT IN HEAT-RELATED ILLNESS?

Industrial hygienists recommend using the Wet Bulb Globe Temperature (WBGT) index to measure workplace conditions. This method closely relates to the body's response to heat.

The WBGT measurement takes into account air temperature, air movement, radiant heat and humidity. There are direct-reading WBGT meters, also called "heat-stress indicators," available commercially. The WBGT measurements can then be related to the physical demands of the job. Only qualified professionals, whether they be in-house staff, consultants, or from the local occupational health and safety regulatory agency, should perform the measurement.

8. SUMMARY

Environment Canada uses humidex to alert the public when conditions of heat and humidity are possibly hazardous. Caution must be used when applying the humidex to workplace conditions. A high humidex can serve as a cue to assess workplace conditions more precisely using the WBGT.

Table - Humidex from temperature and relative humidity readings

Temp (°C)	Relative Humidity (%) 100	95	90	85	80	75	70	65	60	55	50	45	40	35	30	25	20
43	Humidex (°C)			Degree of Comfort									56	54	51	49	47
42	20 - 29			Comfortable								56	54	52	50	48	46
	30 - 39			Varying degrees of comfort													
41	40 - 45			Almost everyone uncomfortable							56	54	52	50	48	46	44
	46 and over			Many types of labour must be													
40				restricted						57	54	52	51	49	47	44	43
39									56	54	53	51	49	47	45	43	41
38							57	56	54	52	51	49	47	46	43	42	40
37					58	57	55	53	51	50	49	47	45	43	42	40	
36			58	57	56	54	53	51	50	48	47	45	43	42	40	38	
35		58	57	56	54	52	51	49	48	47	45	43	42	41	38	37	
34	58	57	55	53	52	51	49	48	47	45	43	42	41	39	37	36	
33	55	54	52	51	50	48	47	46	44	43	42	40	38	37	36	34	
32	52	51	50	49	47	46	45	43	42	41	39	38	37	36	34	33	
31	50	49	48	46	45	44	43	41	40	39	38	36	35	34	33	31	
30	48	47	46	44	43	42	41	40	38	37	36	35	34	33	31	31	
29	46	45	44	43	42	41	39	38	37	36	34	33	32	31	30		
28	43	42	41	41	39	38	37	36	35	34	33	32	31	29	28		
27	41	40	39	38	37	36	35	34	33	32	31	30	29	28	28		
26	39	38	37	36	35	34	33	32	31	31	29	28	28	27			
25	37	36	35	34	33	33	32	31	30	29	28	27	27	26			
24	35	34	33	33	32	31	30	29	28	28	27	26	26	25			
23	33	32	32	31	30	29	28	27	27	26	25	24	23				
22	31	29	29	28	28	27	26	26	24	24	23	23					
21	29	29	28	27	27	26	26	24	24	23	23	22					

Source: Environment Canada

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